ASEE 2010 ZONE IV CONFERENCE
MARCH 25-27
RENO, NEVADA

PROGRAM

EDUCATING ENGINEERS IN THE WILD, WILD WEST

HOSTED BY THE UNIVERSITY OF NEVADA, RENO

SPONSORED BY THE PACIFIC NORTHWEST, PACIFIC SOUTHWEST, & ROCKY MOUNTAIN SECTIONS OF ASEE

CONTENTS

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The following deans each provided financial support for the Keynote Lunch on Friday.

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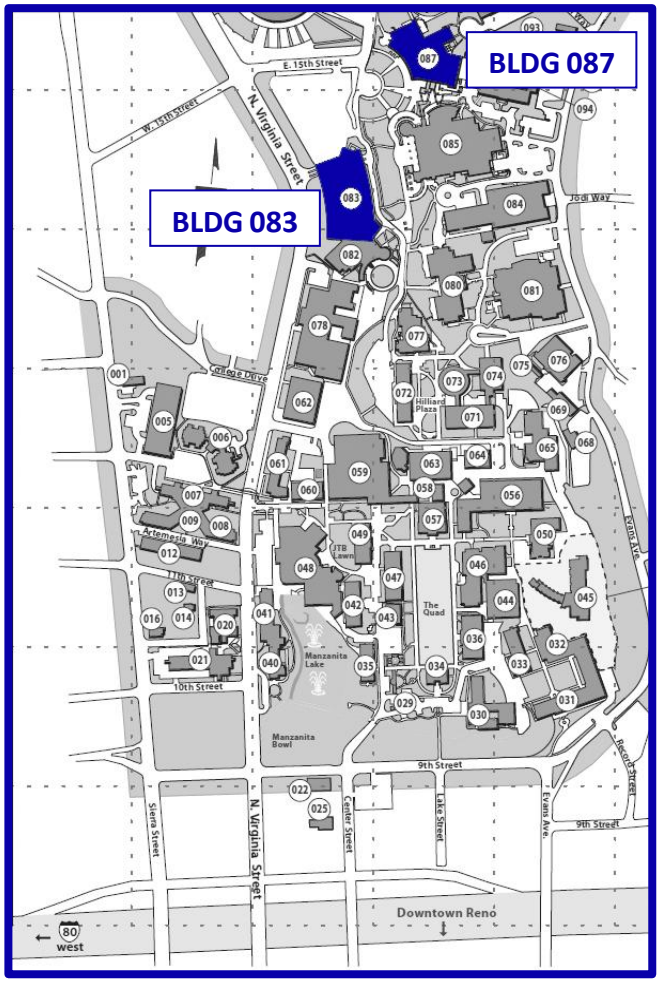
Eric Wang ..... University of Nevada, Reno

SCHEDULE AT A GLANCE

Thursday, March 25			
6:00-8:00pm	Registration		
6:00-8:00pm	Reception (CSU 403)		
Friday, March 26			
7:30am	Registration		
7:30am-8:25am	Breakfast and Welcoming Remarks (Ballroom A)		
	Concurrent Sessions		
	CSU-320	CSU-323	CSU-324
8:30am-10:00am	Designing and Manufacturing (DM)	Electrical Engineering and Technology (EE)	
10:15am-12:00pm	General: Engineering Education 1 (GE1)	Recruitment and Retention (RR)	Workshop: Ranking Tasks
12:00pm-1:10pm	Lunch (Ballroom A) Keynote Speaker: Dr. Pamela Eibeck		
1:15pm-3:00pm	Mechanical and Industrial Engineering and Technology (ME)	Design Projects (DP)	Workshop: Accreditation
3:15pm-5:00pm	Laboratory Studies (LS)	General: Engineering Education 2 (GE2)	Workshop: Engineering Pipeline
6:00pm	Dinner and Awards The National Automobile Museum		
Saturday, March 27			
7:30am-8:10am	Breakfast (Ballroom A)		
8:15am-9:00am	Creating a Culture for Scholarly and Systematic Innovation in Engineering Education (Ballroom A)		
9:15am-12:00pm	Teaching and Grant Writing Workshop (Ballroom A)		
12:00pm	Box Lunch and Final Remarks (Ballroom A)		
12:30pm	Board of Directors Meetings		
	Pacific Northwest Section (CSU 317)	Pacific Southwest Section (CSU 405)	Rocky Mountain Section (CSU 406)

VENUE

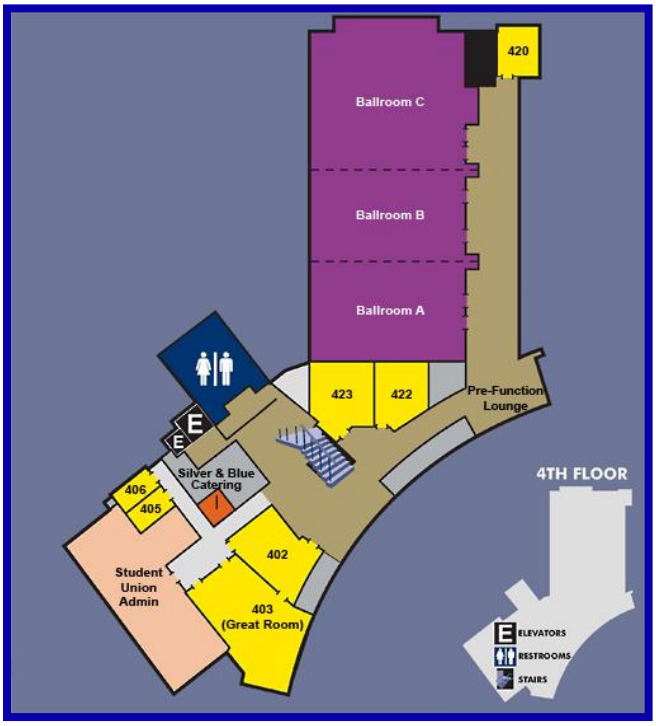


All of the conference activities, with the exception of the Friday night banquet, will be taking place on campus in the new Joe Crowley Student Union. The Thursday night reception and all meals will be in Ballroom A on the 4th floor. All of the conference sessions and workshops will be in rooms 320, 323 and 324 on the 3rd floor.

The student union (building 087 on the campus map) is at the end of 15th Street, just off of Virginia Street which travels north from Interstate 80.

Visitor parking is available at the Brian J. Whalen Parking Complex (building 083 on the campus map). Temporary permits, costing $5 per day, may be purchased at the main parking office located off of 16th Street or via permit dispensers, located at the top of the parking complex. Parking permits are not required on Saturday.

THIRD FLOOR



FOURTH FLOOR

LODGING & TRANSPORTATION

Lodging

The University of Nevada is very close (walking distance) to several first-class hotel casinos. The following recommended hotels each have reasonable rates and high quality rooms: Silver Legacy Resort Casino, Eldorado Hotel & Casino, Siena Hotel & Spa, and Harrah's Reno.

Transportation

The Reno-Tahoe airport is served by several major airlines. Free hotel shuttles run to and from the airport every half hour (http://renoairport.com/to-from-airport/shuttles). The free Sierra Spirit Bus runs between hotels and the university every ten minutes.

Map showing the hotel, banquet and conference venues for the ASEE Zone IV conference, March 25-27, 2010.
472 views - Public
Created on Apr 5, 2007 - Updated Feb 18
By Eric
Rate this map - Write a comment

Parking
Parking passes are available for $5 day at the

Baquet location
The Friday night banquet will be at the National

Conference Location
Joe Crowley Student Union. Conference sessions are on

Metered parking
Closest metered parking (2 hour limit) to conference

Information Kiosk
You can pick up maps of campus at this kiosk.

Sierra Spirit Bus Route
There are bus stops in front of the hotels and at the

Student Union bus stop
Sierra Spirit is a free bus that runs every 10 minutes.

Sierra Spirit bus stop
Sierra Spirit is a free bus that runs every 10 minutes.

Sierra Spirt bus stop
Sierra Spirit is a free bus that runs every 10 minutes.

Wallgreens
Open 24 hours in case you need something.

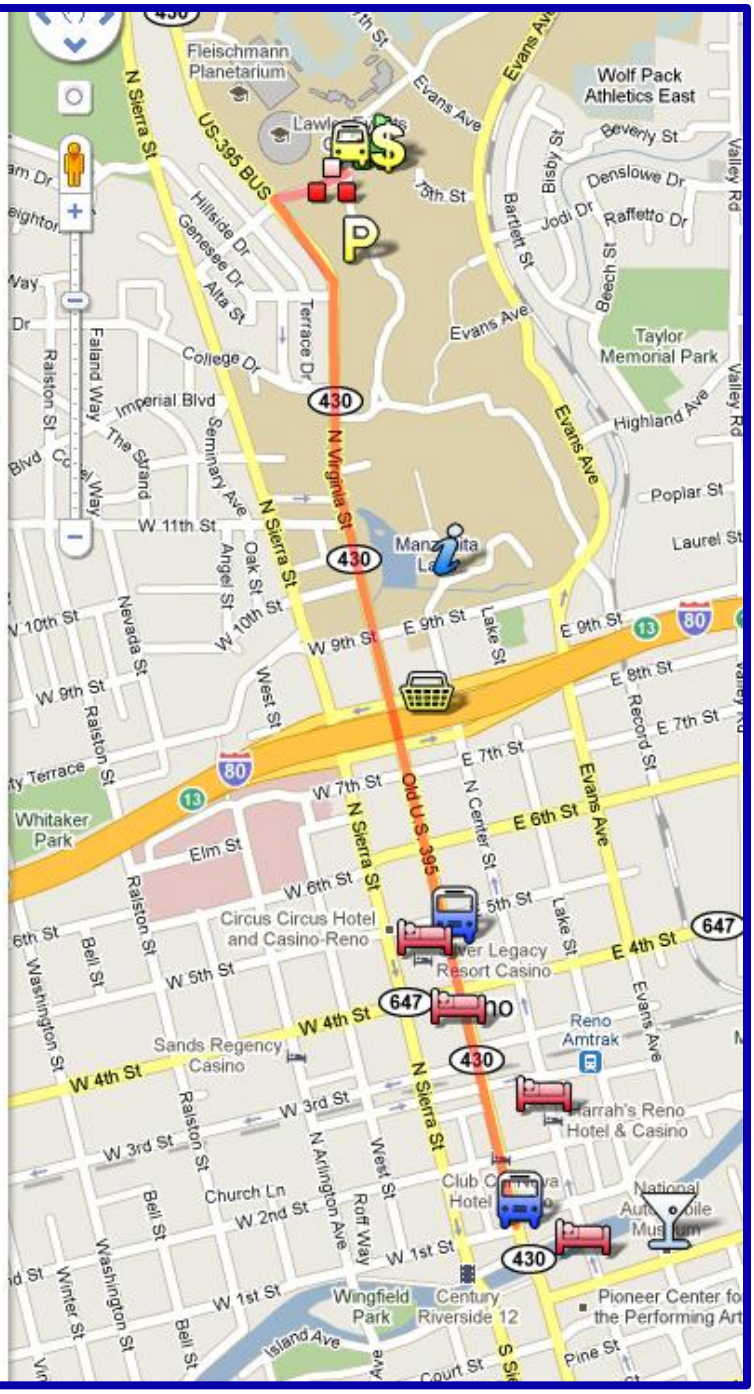
ATMs
Wells Fargo and Bank of America ATMs are located

Silver Legacy
The Silver Legacy is the one of the recommended

Eldorado Hotel
The Eldorado is the one of the recommended

Siena Hotel & Spa
The Siena Hotel is the one of the recommended

Harrah's Hotel & Casino
Harrah's Hotel & Casino is the one of the recommended



AGENDA

THURSDAY, MARCH 25

6:00pm-8:00pm
Welcome Reception
CSU 403
Come and mingle with friends and colleagues from across the zone over light refreshments.

FRIDAY, MARCH 26

7:30am-8:25am
Breakfast
CSU Ballroom A
The conference officially begins with welcoming remarks from Brian Self, Chair of Zone IV.

8:30am-10:00am
Concurrent Sessions

Session DM: Designing and Manufacturing
Location: CSU 320
Moderator: John Murray

Kurt Colvin— California Polytechnic State University, San Luis Obispo
Jim Kish—Kish Fabrication
Bicycle Frame Building for Engineering Undergraduates
This paper gives a status report on the development of a course that teaches engineering undergraduates the process of building a bicycle frame. Learning opportunities are described and methods and equipment are briefly explained.

Maria C Sanchez, Nell Papavasiliou, & Hernan Maldonado—California State University, Fresno
GIRLS SEE Summer Camp: An Event for Future and Current Female Engineering Students
This paper describes the inclusion of the California State University, Fresno, Society of Women Engineers chapter in the organization and implementation of the GIRLS Summer Engineering Experience: a recruitment and retention effort to increase the number of female applicants into the different disciplines of engineering and to increase retention of the current female engineering students.

Craig Johnson—Central Washington University
Use of Video in Casting Education
Our traditional casting course features both lecture and laboratory venues. However it is noted that many students have never interacted with foundry equipment, and there is a significant learning curve associated with the ability of a student to execute basic green sand foundry operations. Education methods were sought to reduce this learning curve resulting in a series of short videos with subsequent incorporation into the curricula.

John M. Murray, Roger A. Greener, & Heong-seok Kim—Southern Utah University
William T. Murray—University of Colorado Boulder
Sustainable Design: Meeting the Thunder Beings of the West
This article presents initial efforts by students, staff, and faculty at Southern Utah University to envision, design and build small-to-medium scale, regionally focused, sustainable systems, and share their results widely.

Session EE: Electrical Engineering and Technology
Location: CSU 323
Moderator: Jude DePalma

Reza Raeisi & Sudhanshu Singh—California State University, Fresno
Curricular Innovation for Real-Time Embedded Systems Course
The objective of this project is to experience and develop rapid prototypes of System-on-chip using soft-core processor in the undergraduate laboratory. We will share the experience on a reconfigurable hardware-software co-design environment and µClinux embedded Real Time Operating System. The lesson learned from this experience is valued and a new embedded systems design course has been developed in our department.

Ding Yuan, Jude DePalma, & Nebojsa Jaksic—Colorado State University – Pueblo

Work in Progress: A Learning Community for First-Year Engineering Students

A learning community has been established for first-year engineering students at Colorado State University - Pueblo. Two engineering courses were linked by shared homework assignments and a robotics lab was added. A survey was developed and administered before and after the lab to evaluate students' satisfaction with the lab experience. Results show an improvement for all survey questions. Future work will assess students' performance and retention.

Amelito Enriquez—Cañada College

Assessing the Effectiveness of Synchronous Content Delivery in an Online Introductory Circuits Analysis Course

This paper presents the results of a study comparing the performance of on-campus and online students in a sophomore-level Circuits Analysis course in a public two-year institution. In this introductory course for all engineering majors, content is delivered simultaneously to on-campus students and online students using a combination of Tablet PC functionality and Elluminate Live! software that allows synchronous delivery through the Internet, as well as recording and archiving of all classroom lecture sessions. Identical homework sets and tests were given to the two groups, and their performance compared.

Johnnie Hancock—Agilent Technologies

Evaluating Oscilloscope Sample Rates vs. Sampling Fidelity: How to Make the Most Accurate Digital Measurements

In the field of academics, this paper can be first applied as a practical application and demonstration of theories presented in courses on digital signal processing. Secondly, when selecting high performance test equipment for electrical engineering and physics research labs, this paper will provide tips on how to select and evaluate digital storage oscilloscopes for accurate reproduction of captured high-speed signals.

10:15am-12:00pm
Concurrent Sessions

Session GE1: General: Engineering Education
Location: CSU 320
Moderator: Marilyn Dyrud

Jim Fischer & Claude Kansaku—Oregon Institute of Technology

Work In Progress – An Applied Mathematics/ Software Engineering Co-Development Project to Dynamically Predict High-Altitude Balloon Position Using Quasi Real-Time Data

This paper describes work in progress of a software engineering/mathematics multi-disciplinary development project in support of student ballooning. The National Space Grant Student Satellite Program1 incorporates high-altitude balloon launches as the "crawl" phase in a "crawl-walk-run-fly" strategy of sending a student designed and built satellite to Mars. Since 2002-03, in affiliation with the Oregon Space Grant Consortium, the LaunchOIT student balloon program at Oregon Institute of Technology has provided a channel for undergraduate research in the "E", "T", and "S" facets of STEM (science, technology, engineering, and mathematics) education. This project intentionally incorporates the "M" facet as a major component in a software engineering project.

Wangping Sun—Oregon Institute of Technology

An Overview of Engineering Education in the US under a Globalization Environment

This paper reviews the current trends of engineering education in the US under globalization environment. It summarizes the requirements for global engineers, and lists the available programs that educate these engineers. It recapitulates the benefits, challenges and efforts to establish a sound global learning environment for engineering students. It concludes that the current practices by various universities will help engineering educators to create more practical, scalable, diversified and sustainable programs in a global context.

Amelito Enriquez—Cañada College
Kate Disney—Mission College
Erik Dunmire—College of Marin

The Dismantling of the Engineering Education Pipeline

This paper addresses the factors that have led to the gradual erosion of the lower-division core curriculum and the effects that these curriculum changes have had on community college engineering programs. It also explores the implications on the future of the engineering education system, the cost to taxpayers, and the system's effectiveness at producing the engineers that are needed to ensure that the United States remains the premier place in the world for innovation.

Allison Kipple & Dieter Otte—Northern Arizona University

Blending Contemporary Research in Sustainability and Fundamental Skills for Graduate Success into a Team-Taught, Introductory Graduate Course

A team-taught graduate course titled, "EGR501: Topics in Sustainability" is required for all students pursuing a Master of Science in Engineering degree at Northern Arizona University. This paper describes a redesign of the EGR501 course to ensure specific skill development and a graduate level of work, while encouraging instructors to be pedagogically creative and to provide contemporary content.

Marilyn A. Dyrud—Oregon Institute of Technology

Remembering the Past to Inform the Future: Engineering and the Holocaust

This paper examines the complicity of the engineering community in the Holocaust, specifically, the eradication of individuals deemed undesirable by the German government. Without the cooperation of professionals on both sides of the Atlantic, the Holocaust could not have happened. The paper explores the role of key German engineering firms, such as I. G. Farben and Topf und Soehne; American involvement by the Ford Motor Company and IBM; and offers pedagogical suggestions for integrating Holocaust materials into engineering and technology classes.

Session RR: Recruitment and Retention
Location: CSU 323
Moderator: Stuart Kellogg

Nebojsa Jaksic, Jeff Piquette, Melvin Druelinger, David Lehmpuhl, Helen Caprioglio, Juyun Cho, Paul Chacon, & Michael Mincic—Colorado State University – Pueblo

Maturing of a Multidisciplinary Cohort of STEM Scholars: Year Three

This work addresses the third-year efforts of Colorado State University-Pueblo faculty in retaining a cohort of low-income students majoring in science, technology, engineering, or mathematics. Originally, 20 in-state freshmen with demonstrated financial need and sufficiently high GPAs (3.0) were awarded four-year scholarships. This work analyzes the third-year activities of rebuilding, sustaining, and nurturing the cohort of about 20 scholars consisting of mechatronics, civil engineering technology, computer information systems, physics, biology, chemistry, and mathematics students.

Amelito Enriquez—Cañada College

Improving the Participation and Retention of Minority Students in Science and Engineering Through Summer Enrichment Programs

In 2008, Cañada College, a Hispanic-Serving community college in Redwood City, CA, was awarded a Minority Science and Engineering Improvement Program (MSEIP) grant by the US Department of Education to develop and implement a project that aims to maximize the likelihood of success among underrepresented and educationally disadvantaged students interested in pursuing careers in STEM fields. The project, entitled Student On-ramp Leading to Engineering and Sciences (SOLES), incorporates strategies that address challenges and barriers to recruitment, retention and success of minority students.

Debra Larson and Marissa Mourer—Northern Arizona University

Student Recruitment by Faculty Phone-a-Thons

The authors describe a program of involving faculty from the College of Engineering, Forestry and

Natural Sciences in an annual phone-a-thon. Each year since the fall of 2005, faculty have been organized to call students who have submitted an application to study in an engineering, science, mathematics, or forestry major at Northern Arizona University, but have not yet committed to enroll in the university via deposit. This paper will present summary data with conclusions about the effectiveness of this annual effort, which takes place over the course of two evenings each year.

Edwin Odom, Don Blackketter, Larry Stauffer, & Steven Beyerlein—University of Idaho

Engineering Student Services Center Model

To better address special needs of pre-college and pre-engineering at the University, the Dean of Engineering at the University of Idaho recently challenged faculty, staff, and students to create a college-wide student services center that would become part of the Dean's office complex. The design solution that has emerged through this dialogue is a visually exciting and transparent space capable of supporting a broad range of activities such as recruiting, advising, mentoring, and leadership training.

Stuart Kellogg—South Dakota School of Mines and Technology

Why do they Come, Why do they Not Return

Declining interest in engineering in high school students exacerbated by traditionally high student dropout rates in engineering have led to steep enrollment decreases in many engineering programs. In this preliminary research, we obtain university specific data through three simple post card surveys. One survey queries students who elected not to continue their engineering course of study and a second survey queried first year students as to their rationale for final university selection. Survey results are analyzed and compared to the literature research as well as to campus baseline data. In addition, survey results for discontinuance are analyzed and compared to overall student performance and academic preparation prior to discontinuance.

Shane Brown—Washington State University

Ranking Tasks Workshop

Location: CSU-324

Dr. Brown, State University has organized a special session on ranking tasks. Ranking tasks are comparative exercises that require students to rank multiple physical situations on a specified criterion. A properly designed ranking task will assist students in understanding the relationship between the conditions described in the problem and the ranking criteria. Ranking tasks have been used in physics education for several years and have been shown to improve student understanding of key physics concepts.

12:00pm-1:10pm
Lunch

Pamela Eibeck—University of the Pacific

Keynote Presentation

Dr Eibeck became President of the University of the Pacific on July 1, 2009. Her Presidency follows a distinguished career as a researcher, teacher, educational reformer, and university administrator. Prior to joining Pacific, Eibeck was Dean of the Edward E Whitacre Jr. College of Engineering at Texas Tech – one of the nation's largest engineering colleges with 4400 students, 156 faculty, and five research centers. Dr Eibeck will discuss the increasing challenges facing today's universities.

1:15pm-3:00pm
Concurrent Sessions

Session ME: Mechanical and Industrial Engineering and Technology

Location: CSU 320

Moderator: James Widmann

Jeigh Shelley—California State University, Fresno

Technology to the Rescue! Lessons Learned from the Forced On-line Streaming of Dynamics Class

Fall semester 2008, an upper division undergraduate Dynamics class was streamed via

Elluminate*Live*! to students on the main campus from a physically distant instructor. The course had been developed for lecture delivery through interactive broadcast television between equipped studio classrooms. When the generating studio classroom was vandalized by external intruders, the lectures were ported to live interactive streaming video to personal computers. This paper will discuss both student outcomes and instructor lessons learned from that semester including comparison of results for Dynamics Concepts Inventories with other semesters, Blackboard usage during the semester, anecdotes from students, and observations from the instructor.

Kenneth W. Santarelli—California State University, Fresno

An Evolving Model for Delivering Engineering Education to a Distant Location

A unique approach has evolved for providing ABET accredited undergraduate engineering education for the residents of the Greater Antelope Valley and adjacent regions in the high desert of California. This paper will describe the model in its current state of evolution and report on its effectiveness for providing undergraduate engineering education to a distant location. This paper will also report on current events that are likely to impact the model's continuing development.

Lizabeth Thompson Schlemer & Faith Mimnaugh—California Polytechnic State University, San Luis Obispo

Using Sports Coaching Techniques to Enhance Project Based Learning Instruction

This paper will organize some of the best practices in sports coaching and draw parallels that will enhance student learning in project based instruction. The paper discusses the parallels between the instructor and the coach and highlights three broad categories of techniques: 1) Practice and games, 2) Teamwork and individual performance, and 3) Individual feedback for improvement. Some of these techniques have been used to successfully enhance learning in a senior design course in Industrial Engineering at Cal Poly.

Paul van Bloemen Waanders, Andrew Kean, Glen Thorncroft & Brian Self—California Polytechnic State University, San Luis Obispo

Work In Progress: Model Eliciting Activity for an Undergraduate Thermal Measurements Laboratory

At Cal Poly, San Luis Obispo, our undergraduate engineering education is designed to prepare students for industry. The rise of technology in modern engineering demands a shift in the way undergraduates are prepared for the modern workplace. Engineering problems should focus on the development of analytical models that describe a system. These models, once made, can be used to solve future problems of a similar type. By recreating and inventing some simple engineering problems that can be solved using models, instructors can introduce students to this process to prepare for professional practice.

James M. Widmann & Brian P. Self—California Polytechnic State University, San Luis Obispo

Work in Progress: Student-Created Multimedia Dynamics Example Problems - A Model-Eliciting Activity

Instructors and publishers alike have begun to explore the benefits of online and multimedia content for enhanced learning in a number of engineering courses. Topics in Dynamics can especially benefit from this medium, where videos and simulations can be used to highlight the time-dependent nature of moving systems. Instead of developing such content ourselves, we decided to create a Model-Eliciting Activity in which the students were required to develop multi-media example problems. This work in progress describes the basic objectives of the project and a preliminary assessment of its effectiveness.

Session DP: Design Projects
Location: CSU 323
Moderator: Jose Rivera

Jack Sun, Youssef Chedid, Kaveh Hajimohammadreza, Efrain Mendoza, Silvestre Sanchez, Kinal Vachhani, James Flynn, Sharlene Katz—California State University, Northridge

A High Frequency Transceiver for Amateur Radio Using Software Defined Radio

This paper describes a Software Defined Radio (SDR) based High Frequency transceiver for amateur radio that was designed to fulfill the senior design project requirement in Electrical and Computer Engineering at California State University, Northridge. The uniqueness of the SDR approach is that most of the hardware components found in a conventional transceiver are replaced by software. This results in near-ideal filters and a reduction in overall physical size. In addition, any improvements or changes to the SDR transceiver would only require a software upgrade as opposed to a labor-intensive redesign of the hardware version of the transceiver itself.

Brian Meadows, Charles Judah, Michael Berman, Derrick Jones, Ryan Rawson, David Alvarez, James Flynn, Sharlene Katz—California State University, Northridge

Software Defined Radio Communication Link for an Unmanned Aerial Vehicle

This paper describes a Senior Design Project at California State University Northridge to design and implement a communication link between a ground station and an Unmanned Aerial Vehicle using software defined radio. Specifically, this project focused on utilizing and extending an open source software library known as GNU Radio to design a ground station, communication link, and on board controller.

Gemunu Happawana & Arvind Gopi—California State University, Fresno, CA

Six by Six Terrain Vehicle for Optimal Mass, Geometric Configuration and Tractive Efficiency

This paper presents a new design methodology for determining the optimal mass, geometric configuration and wheel power distribution of a 6x6 terrain vehicle, in order to provide the vehicle with optimized traction. The educational aspect of this paper is to motivate and integrate student learning process through mathematical models and equations for design.

Brittany Ballard, Nathan Barrett, Brandy Holmes, & Jay McCormack—University of Idaho

A Student Developed Repository of Design Knowledge

The construction and use of a repository for design knowledge can serve several roles in an educational setting. For the instructor, the repository can act as a window into the students' design process, status in a design project, and understanding of design concepts where the construction and use of elements of design knowledge require achievement at levels of learner knowledge corresponding to basic understanding, understanding of relationships, and transfer of knowledge. For the student, the repository can be a source of solutions to specific design problems and provides the structure and easy to use digital tools for reporting on design accomplishments. This presentation reviews the implementation of a design repository used in a sophomore mechanical engineering design course.

Jose Rivera, Gemunu Happawana, Patrick Reilly, & Walter Mizuno—California State University, Fresno

Three Stage Vibration Isolation for Unmanned Aerial Vehicle Gimbal Targeting System

A student project funded by the air force, required mounting a high resolution camera, TASE gimbal, to be mounted in a model airplane powered by a gasoline engine. Model airplanes such as the Sig Rascal experience vibration and excitation forces derived from the rotating blades and the reciprocating parts of the gas engine. To resolve this, shock and vibration absorbing studies were conducted and proper materials were introduced to isolate vibrations from important components such as the TASE gimbal. A performance comparison of the vibration isolation system between a gas and an electric engine was studied.

Patricia Daniels—Seattle University

Accreditation Workshop

Location: CSU-324

Dr. Daniels, Professor Emerita at Seattle University and Former Chair, ABET Engineering Accreditation Commission, will conduct an accreditation workshop. This workshop will present an overview of the ABET accreditation process, featuring a discussion of the engineering accreditation criteria, and highlighting recent and proposed changes including the new ABET "harmonized criteria". Suggestions for preparing an effective self study and planning for a successful accreditation visit will also be covered.

3:15pm-5:00pm
Concurrent Sessions

Session LS: Laboratory Studies

Location: CSU 320

Moderator: Eniko Enikov

Said Shakerin & Camilla Saviz—University of the Pacific

Fountain Bench – A Hydraulic Apparatus for Formal and Informal Science Education

The Fountain Bench is a new modularized and portable apparatus that has been developed and put to use for the purpose of demonstrating several water flow cases. The goals of using the apparatus are to enhance presentation of course material in a Fluid Mechanics course and to assist in informal education provided to younger students and the general public attending university events. This paper provides a detailed description of the apparatus and examples of how it has been used so that interested readers can build the apparatus for their own use.

James Helbling—Embry-Riddle Aeronautical University

Using Design, Build, Fly Projects to Provide Life Lessons in Engineering

This paper recounts the methods applied in a senior design course taught at Embry-Riddle Aeronautical University in Prescott, Arizona. It will discuss the life lessons provided via design, build, fly projects which allow students to experience competition and collaboration as part of the same year-long project.

Jeff Burmeister & Kyle Watson—University of the Pacific

Spaghetti Bridges: Build, Load and Repeat

The use of spaghetti bridges in introduction to engineering courses has been done before; however, only one bridge is typically done per student team. Requiring the students to design more than one bridge and loading each to failure has a greater impact on student learning by forcing the students to understand the consequences of the differences between their bridges. A description of the design project and the results from implementing the project in improving the impact on student learning and the appreciation of engineering are reported.

David Lanning, Wahyu Lestari, & Shirley Waterhouse—Embry-Riddle Aeronautical University

A Laboratory-Based Course in Aerospace Engineering Failure

This paper reports on a unique laboratory-based course in aerospace engineering failure created for undergraduate engineering students. The course is composed of a set of learning modules, and includes advanced fatigue and fracture, thermo-mechanical failure, fastener failure, wear, corrosion, impact of composite materials, statistical analysis of failures, non-destructive evaluation, and structural health monitoring. A significant amount of new learning materials have been created and are being made available to the public online, and a select portion of the laboratory component will be assembled into a module to be presented to high school students at the yearly Aerospace Engineering Summer Camp held at Embry-Riddle.

Eniko T. Enikov, Vasco Polyzoev & Joshua Gill—University of Arizona

Low-Cost Take-Home Experiment on Classical Control Using Matlab/Simulink Real-Time Windows Target

This paper presents a low-cost hands-on experiment for a classical undergraduate controls course offered on behalf of non-electrical engineering majors. The project was tested in a classical control systems design class offered to senior-level mechanical engineering students. Student feedback and survey data on the effectiveness of the module is also presented.

Session GE2: General: Engineering Education

Location: CSU 323

Moderator: Oenardi Lawanta

Devlin Montfort & Shane Brown—Washington State University

Conceptual Change and Understanding in Engineering Education

In the study of science, technology, engineering and mathematics education there is a tradition of evidence showing that students—despite their abundant procedural knowledge and computational skills—lack understanding of fundamental physical phenomena. It has been noted that sometimes what students are taught is in direct conflict with their everyday experiences. The difficult process of learning new material that contradicts existing knowledge and ways of thinking is called conceptual change. The purpose of this paper is to present the two leading theories of conceptual change, examples of current research in this area, and how they can be applied to engineering teaching and learning.

William Bloxsom—Colorado State University – Pueblo

Engineering Economy with "Green" and Energy Evaluations

The core material of an engineering economy class is the mathematical means to evaluate money through time and the concepts of project evaluation in terms of engineering limitations and financial considerations. The students use these tools to evaluate contemporary "green" topics that they have researched. One class considered the economics of recycling. Another class has researched the implications of various means of commercial electric generation. In both cases, the individual students acquire an expertise in a single area of the project and contribute that knowledge during the period, in-class group analysis and discussions.

Susan Conrad & Peter Dusicka—Portland State University

Timothy Pfeiffer—Foundation Engineering Inc.

Work in Progress: Understanding Student and Workplace Writing in Civil Engineering

This project addresses a continuing problem in engineering education: the mismatch between the writing skills of engineering program graduates and the demands of writing in the workplace. The project takes a new approach to investigating the problem and devising instructional materials because it is based on a large-scale investigation of the organization, grammar, and vocabulary in texts written by numerous students and practitioners. It uses computer-assisted analysis techniques from the field of applied linguistics and involves collaboration among applied linguists, engineering faculty, and engineering practitioners.

Ann-Marie Vollstedt & Eric Wang—University of Nevada, Reno

The Relationship between Self Efficacy, Critical Thinking, Grades, and the Quality of First Year Engineering Students

In a study comparing the relationship between content knowledge, self efficacy, cognitive level, and critical thinking level, it was found that critical thinking and self efficacy scores are positively correlated with each other, but neither is correlated with the student's course grade. In addition students who stated that they believed they would earn an 'A' in the first year course performed significantly better in critical thinking. Critical thinking and self efficacy scores did not have a correlation with overall course grades. This

research supports the common belief held by many faculty: student grades are not the best indicator of student quality.

Oenardi Lawanto—Utah State University
Understanding the Correlation Between Goal Orientation and Self-Efficacy for Learning and Performance in an Engineering Design Activity in Grades 9-12
This study was conducted to evaluate the relationship between students' goal orientation and self-efficacy for learning and performance while engaged in an engineering design activity in grades 9-12. Goal orientation includes students' intrinsic and extrinsic goal orientations. Self-efficacy for learning and performance is a strong belief about the student's ability and confidence to perform the task.

Amelito Enriquez, Kate Disney, & Erik Dunmire—
California Engineering Liaison Council
Engineering Education Pipeline Workshop
A panel of community college and university faculty from the California Engineering Liaison Council (CA ELC) will facilitate a workshop to discuss various perspectives on the growing challenges that face community college engineering programs, and to explore possible remedies for this potentially grave threat to our engineering education system. This workshop will provide a more interactive follow-up to an earlier paper presentation on "The Dismantling of the Engineering Education Pipeline," by Amelito Enriquez, Kate Disney, and Erik Dunmire.

6:00pm
Awards Dinner
The National Automobile Museum
The Friday evening catered event will be held at the National Automobile Museum (10 Lake Street: see map on Page 5). Following a brief awards ceremony, conference attendees will be able to wander through the museum while sampling different foods and chatting with fellow educators.

SATURDAY, MARCH 27

7:30am-8:10am
Breakfast
CSU Ballroom A

8:15am-9:00am
Creating a Culture for Scholarly and Systematic Innovation in Engineering Education
CSU Ballroom A
Welcome! Please join us in a conversation on creating a more vibrant U.S. engineering academic culture through scholarly and systematic innovation in engineering education. This conversation began in June 2006 when the American Society for Engineering Education launched an initiative, "Advancing the Scholarship of Engineering Education: A Year of Dialogue." We are now expanding the conversation to include the broader U.S. engineering community and other national and international stakeholders in engineering education. The project team invites you to join us in this important conversation! We have a timely opportunity to make our already world-class engineering programs even better.

9:15am-12:00pm
Teaching and Grant Writing Workshop
CSU Ballroom A
Drs. Barbara Olds and Ron Miller from the Colorado School of Mines will conduct a workshop that will target newer faculty members, but will useful to all. The workshop will include tips on active learning techniques and providing meaningful formative and classroom assessment to your students. The last portion of the workshop will focus on writing successful NSF grants.

12:00pm
Lunch

12:30pm
Section Business Meetings
Business meetings for each section will be held. Section leadership and all campus reps are invited to attend meetings for their respective sections.

AUTHOR/SPEAKER INDEX